

REMARKS

This paper is in response to the final official action of July 26, 2005. Reconsideration is requested.

Claims 1, 3, 5-9, 11, 12, 14-18, and 20 were rejected as obvious over Lee U.S. 6,607,955 in view of Tsuchiya et al. U.S. 6,585,568. Claims 4 and 13 were rejected as obvious over Lee and Tsuchiya, and further in view of Small et al. U.S. 6,635,186. Claims 10 and 19 were rejected as obvious over Lee and Tsuchiya, and further in view of Liu et al. U.S. 6,635,576. Reconsideration is requested.

Independent claims 1 and 12 now recite the steps of forming a planarized interlayer film covering the resultant structure from the steps of forming a wordline pattern with a sequentially stacked structure of a wordline conductive material and a hard mask nitride film on a semiconductor substrate and forming a spacer on a side of the wordline pattern, and also recite the step of forming the polysilicon layer on the entire surface of the resultant structure, and performing a CMP process on the resultant structure until the wordline pattern is exposed.

It is submitted that Lee, whether taken alone or in combination, does not show all the steps of the amended claims.

None of Tsuchiya, Small, or Liu remedy these deficiencies.

The invention relates to a method for manufacturing a polysilicon contact plug employing a CMP process onto the combination layer of the polysilicon layer and interlayer insulating film (oxide film) by using an acidic slurry composition containing an oxidizer.

Referring to page 2, lines 19-28 of the present specification, a conventional polishing process onto the combination layer of polysilicon layer and interlayer insulating film is performed using a basic slurry so that "dishing" occurs on the interlayer insulating film since the polishing selectivity ratio of the basic slurry onto the interlayer insulating film is higher than that of the polysilicon layer.

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In order to solve this conventional problem, the invention employs an acidic slurry instead of the basic slurry. It is well-known to use an acidic slurry to polish a metal but it is not known to use an acidic slurry for polishing the combination layer of the polysilicon layer and oxide film, especially for the purpose of making the polishing selectivity of the two different films substantially same.

Lee is different from the present invention in that it discloses a conventional CMP process using a basic slurry.

Tsuchiya et al. discloses another conventional method using an acidic CMP slurry for polishing a copper-based metal film 5 (see Figs 1 and 2). However, Tsuchiya et al. does not suggest an idea of applying the acidic slurry onto the combination layer of the polysilicon layer and the oxide film.

Similar to Tsuchiya et al., Small et al. also discloses a conventional art employing an acidic slurry for removing aluminum, copper or tungsten.

Liu et al. discloses a method for fabricating borderless contact using SiON material, but does not teach about using an acidic slurry onto combination layer for the purpose suggested in the present invention.

Furthermore, according to Tsuchiya et al. and Small et al., the slurry includes a chelating agent to prevent re-deposition of metal ion in a process for polishing a metal layer. However, in case the slurry is employed to polish non-metal layers such as polysilicon layer, oxide film and nitride film, the chelating agent causes a blocking layer to form on the subject layer and makes it difficult to polish the subject layer (polysilicon layer, oxide film and nitride film).

Therefore, it is submitted that the art is not properly combinable and even if combined would not result in the claimed invention.

For the foregoing reasons, it is believed that the claims patentably define over the applied references.

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Entry and consideration of the foregoing amendments after final rejection are solicited, as it is believed the amendments place the application in better form for consideration on appeal, and are made in response to bases for rejections first advanced in the most recent official action.

Should the examiner wish to discuss the foregoing or any matter of form in an effort to advance this application toward allowance, he is urged to telephone the undersigned at the indicated number.

Respectfully submitted,

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